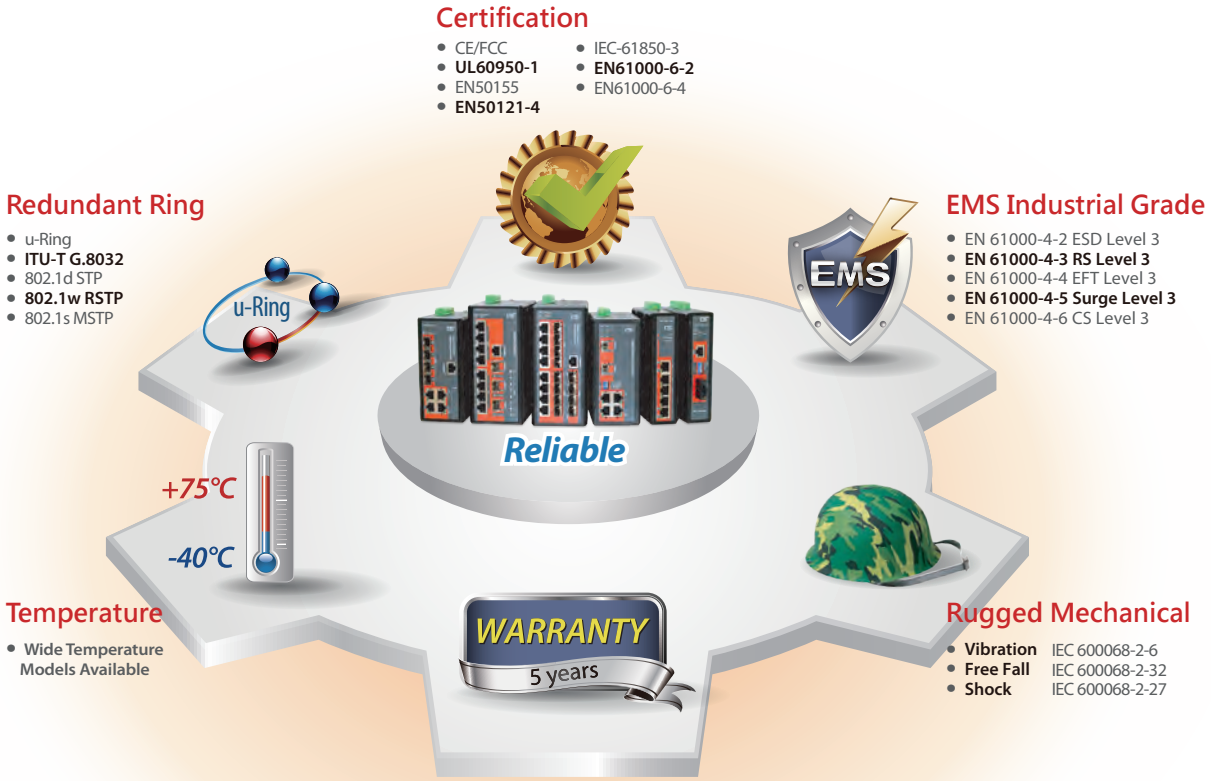
Industrial Ethernet Network

Industrial networking switches, designed and manufactured by CTC Union, are to deliver high reliable solutions in fields such as automation, railway transmission, power substation and so on. The products have passed strict tests and are certified to UL60950-1 safety standard, railway traffic EN50121-4 & EN50155 , heavy industrial Environment EN61000-6-2 & EN61000-6-4, and power substation IEC61850-3 standards.

Reliability Elements



Key Certification

To reduce risks of electric shocks, fire, energy related hazards, heat related hazards, mechanical hazards, radiation, and chemical hazards for operator, layman or service personnel.

EN50121-4

For trackside and railway applications. The certification is test EMI and EMS (Electromagnetic Susceptibility Protection) for Surge, EFT, ESD, CS, RS, PFMF requirements and so on.

EN50155

For railway, buses and moving machine applications. The certification is test EMI and EMS (Electromagnetic Susceptibility Protection) for Surge, EFT, ESD, CS, RS, PFMF, DIP requirements and so on. The devices can also withstand environmental disturbances including vibration, shock and free fall variations.

EN61000-6-2
EN61000-6-4

For Heavy Industrial Environment application. The certification is test EMI and EMS (Electromagnetic Susceptibility Protection) for Surge, EFT, ESD, CS, RS, PFMF requirements and so on.

IEC 61850-3

For power substation applications. The certification is test EMI and EMS (Electromagnetic Susceptibility Protection) for Surge, EFT, ESD, CS, RS, PFMF, DIP requirements and so on.

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Comparison of CE & EN50121-4 Compliant Standards for Trackside

Compared with general CE compliant products, our EN50121-4 products meet a range of demanding standards, including EMC, vibration and power. For trackside applications, surge, EFT, ESD level indicators are also important to successful installations. See below for a brief comparison between general CE compliant and EN50121-4 (Trackside) test levels :

	CE Compliant	EN50121-4 Compliant (Trackside)
Surge		
Signal L-E	1kV	2kV
Signal L-L	N/A	2kV
DC Power L-E	0.5kV	2kV
DC Power L-L	0.5kV	2kV
ESD (Contact)	4kV	6kV
Radio frequency magnetic field	10V/m	20V/m
EFT (fast transient)	0.5kV Criteria B*	2kV Criteria A*
Power magnetic field	10 A/meter	300 A/meter
Pulse magnetic field	N/A	300 A/meter

* Criteria A: During the test storage devices shall maintain normal operation both in read/write and in stand-by conditions.
* Criteria B: During and after the test failures which can be recovered by read and write retires are permissible (temporary delay in processing caused by this process is acceptable).

Managed by Centralized SmartView

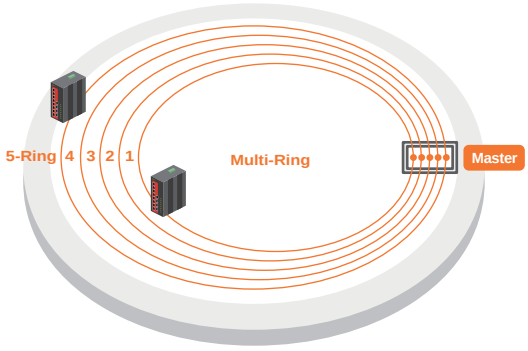
SmartView is a centralized network management platform that offers visual representations of connected devices. Users can remotely access and manage devices and upgrade Firmware image for a group of member devices at the far end via user-friendly and easy-to-use operation interface. So far, Smartview contains Fault management, Configuration Management, Accounting management, Performance Management and Security management.

Quick & Easy SmartConfig for Mass Configuration

SmartConfig is an intuitive and easy-to-use network configuration tool that enables users to access multiple and discovered industrial networking products at a time to perform mass configuration tasks. Compared with one-to-one configuration, SmartConfig can complete a task automatically and simultaneously even faster and effortlessly. SmartConfig provides functions like Account Management, Auto Discovery, Auto Grouping/Create/Modify Group, Device Configuration, u-Ring Configuration, IP Address Assignment, Firmware Upgrade, Export/Import Configuration, Connectivity Test and so on.

The most user-Friendly & Flexible u-Ring Network Redundancy cabling

- Maximum up to 5 rings, and up to 250 devices in a ring
- Supports three u-Ring types (u-Ring, u-Chain, Sub-Ring)
- Recovery time < 10ms
- User Friendly configuration GUI



・5-Ring(Max.)
・250 nodes expansion pre ring

u-Ring configuration

Delete	Instance	Type	Master	East		West	
				Port	Edge	Port	Edge
Delete	1	u-Ring		1		2	
Delete	2	u-Ring		4		3	
Delete	3	u-Ring		10 (Fiber2)		11 (Fiber3)	
Delete	4	Sub-Ring		6			
Delete	5	u-Chain		5		9 (Fiber1)	

User-Friendly Configuration Web Interface

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Supported Standard ITU G.8032, MSTP, RSTP, STP Network Redundancy cabling

Other than the proprietary u-Ring redundancy protocol, standard ring redundancy protocols such as ITU G.8032, MSTP, RSTP and STP are also supported. Users can choose the most suitable ring redundancy protocol based on their actual networking needs.

IEEE1588v2 PTP Supported

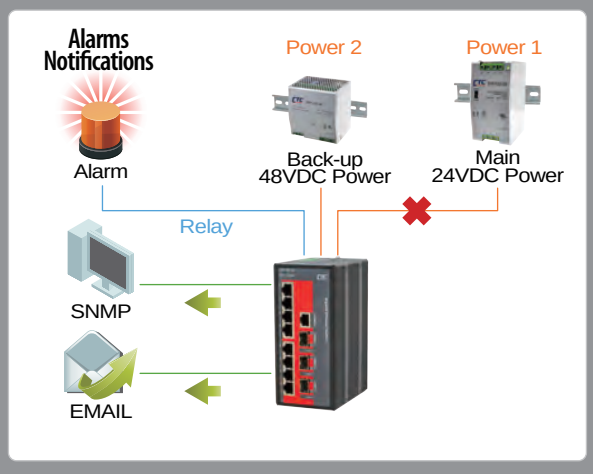
CTC Union's IEEE 1588v2 PTP (Precision Time Protocol) feature provides timestamp for receive and transmit frames to synchronize clocks in a network. Our IEEE 1588v2 PTP-enabled products support a hierarchical master-slave structure for clock distribution and each port provides Master, Slave, and Boundary mode. Through continuous message exchanges between the master and slave clock, our products can achieve synchronization accuracy in sub-microsecond range.

5-Year Warranty and High MTBF Values

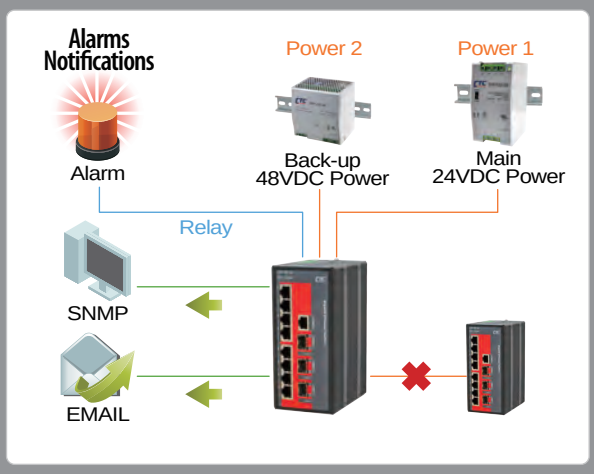
Before the industrial networking products are delivered to customers, they were undergone reliability tests that meet rigorous standards in our lab and various strict quality checks in our factory. Our products using specially-chosen parts such as industrial-grade IC, PCB, capacitor, transformers, screws and specially-installed method for heat-sink have been approved to achieve high MTBF values. To demonstrate our confidence in our products, we offer a 5-Year warranty on our industrial networking products to customers.

Diverse & Immediate Alarm Notifications

The industrial networking products offer several ways of notifying alarms in response to a particular abnormal event. One way is to send an Email warning or to trigger a SNMP trap when a fault is automatically detected. These faulty events can also be recorded in system log for further analysis. The other way is to use alarm relay contacts on the terminal block. When the selected alarm events (power failure, link up & down, etc.) occur, the alarm relay contacts will be open and the FAULT LED will be lit to alert the user.



Alarms for Main Power Failure



Alarms for Main Port Link Down

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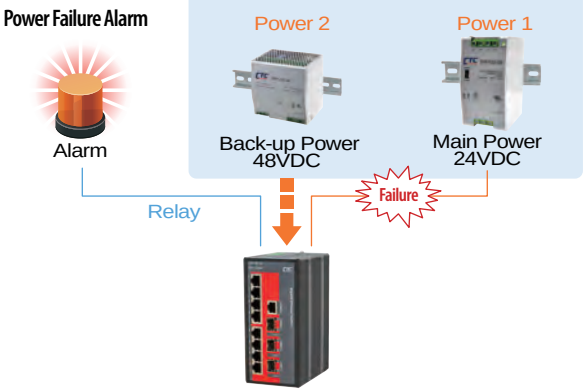
Rugged & Fanless Design with Wide Operating Temperature

CTC Union's industrial networking products are all fan-less and protected in a rugged metal housing to endure extreme and rapidly changing conditions such as shock, vibration, moisture, etc. They can also operate at standard (-10°C~60°C) and wide (-40°C~75°C) operating temperature range, making them suitable for harsh environments like railways, roadside, factory, warehouse, dock, parking lot, electrical poles and so on.

Redundant & Wide Range Power Inputs

The industrial networking products use a removable terminal block to offer two separate and wide range DC power (12/24/48V) connections. Basically, one pair of power connection is enough to power up the system. However, if two power inputs are connected, the back-up power supply will take over to provide the entire power when the main power supply fails. The power redundancy is enabled automatically.



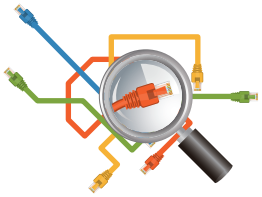
IEEE 802.3az Green Power

Reduce power consumption in following case:
- During periods of low data activity
- Ports in idle state
- Output power dependent on cable length

802.3az Less Power Consumption GREEN

Cable Diagnostics

Cable Diagnostics feature is useful to troubleshoot Ethernet cabling problems especially for Ethernet cables buried or hidden underground. The diagnostic results reveal cable states (shorts or open), the length of cable and distances to the faults.



PoE Series

All PoE models are fan-less and designed in robust IP30 housing that make them ideal for din rail installation or wall mounting. Additionally, PoE models support IEEE 802.3af/802.3at standards which are able to provide up to 30W power for per port. With power boost and regulation technology, PoE devices can offer 24~48V to 55V power supply for applications that need more power inputs.

Remote PD Auto Test & Reset

- PoE PD failure auto checking, and auto reset when PD fail.
- The features help to save truck rolls and reduce operational expenses.

PD Auto Test & Reset Process

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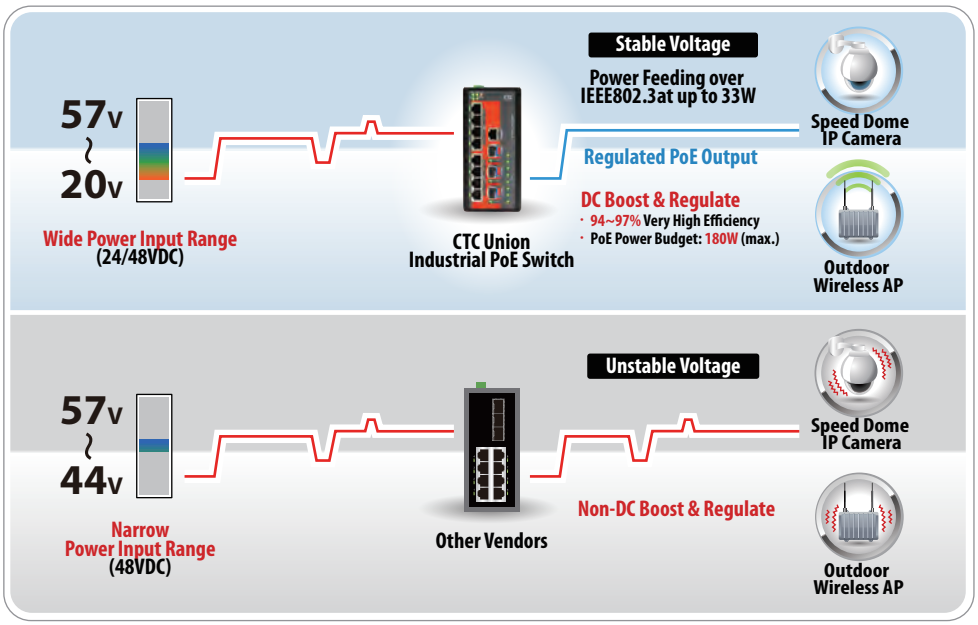
Boost DC Power & Regulate Power Voltage

- 24/48 (20~57) VDC wide range input power with built-in very high efficiency booster (94~97%) to rise up 55 VDC for PoE output
- Stabilized and regulated PoE output voltage at 55VDC to enhance the stability of your connected PD devices.



PoE ON/OFF Weekly Scheduling

PoE switches offer PoE ON/OFF scheduling function on a weekly basis to provide PoE to the connected devices based on the planned schedule. The features help to save truck rolls and reduce operational expenses.

PoE Scenarios

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EN50155 Compliant Industrial Ethernet Switches

The ITP series has obtained EN50155 certification that meets the EMC (Electromagnetic compatibility standard) requirements and EMS (Electromagnetic Susceptibility Protection) for surge, EFT, ESD, PFMF, DIP and other requirements. ITP series can withstand environmental disturbances including vibration and shock variations (IEC-61373). Equipped with these features, ITP series is ideal for deployments in railways, buses, subways, high speed rails and other industrial environments.

Employing Rugged M12 Connectors

ITP series adopts rugged M12 industry standard connectors for connectivity to ensure reliable operation for industrial applications especially exposing in environments with higher levels of vibration and shock. ITP series' M12 connectors are vibration, shock (IEC-61373) resistant so that they are extremely popular for applications such as railways, buses, subways and automation .

Anti-vibration

EN50155 Typical Applications

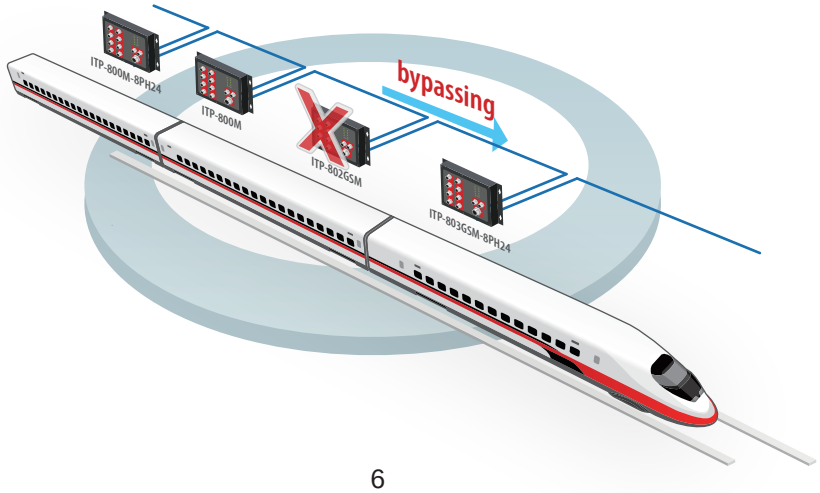
IP67 waterproof design to Protect against Dust, Oil and Water

All CTC Union's EN50155 compliant switches are designed to be used in industrial and the harshest environments. With higher protection level - IP67 rating, they are able to protect against dust, oil and submission in water and to meet the most rigorous standards for extreme temperature, vibration, shock, humidity and others. EN50155 compliant products with M12 connectors and IP67 rating are purpose-built for automotive, manufacturing, oil, gas, mining and other industrial environments, requiring no extra housing protection.

IP67 Waterproof

Copper Interface Bypass Relay Function in Daisy Chain Topology

CTC Union's EN50155 compliant products offer two copper interfaces with auto bypass relay function in the event of sudden power loss particularly in daisy chain or linear topology structure. When power failure occurs in one of the switches on a train, bypass relay function can activate bypassing mechanism by interconnecting internal circuits automatically to ensure that links between carriages operate uninterruptedly and continuously.



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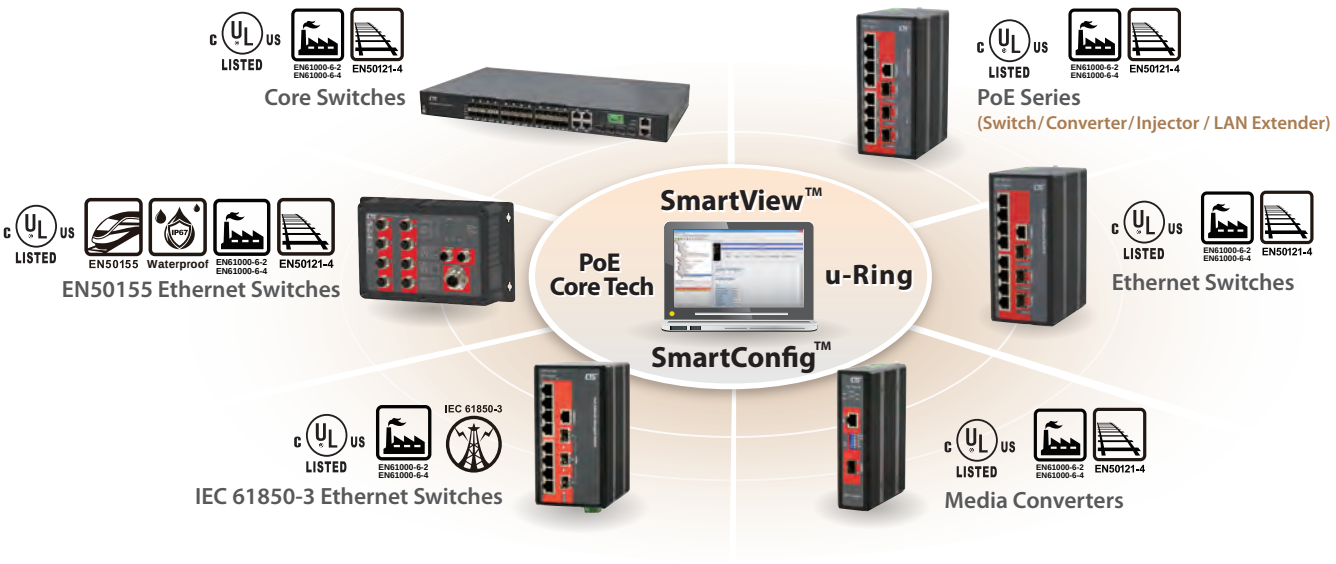
Industrial Ethernet Product Category



Selection Table

Industrial Core Switches

Model Name	Managed	Total Port	UTP M12		10GbE	Certification			
			10/100 Base-TX	10/100/1000 Base-T UTP or 100/1000Base-X SFP	IEEE 802.3ae SFP+	Safety UL60950-1	EN50121-4	EN61000-6-2 EN61000-6-4	CE, FCC
ICS-24S4XM	✓	28	20	4 Combo	4	✓	✓	✓	✓
ICS-24S2XM	✓	26	20	4 Combo	2	✓	✓	✓	✓

Industrial Ethernet Switches

Model Name	Managed	Total Port	UTP		Fiber			Certification			
			10/100 Base-TX	10/100/1000 Base-T	100Base-FX	1000Base-X	Dual Speed 100/1000Base-X	Railway EN50121-4	Safety UL60950-1	EN61000-6-2 EN61000-6-4	CE, FCC
IFS-500		5	5					✓		✓	✓
IFS-800		8	8					✓		✓	✓
IFS-401F		5	4		1 SC/ST			✓		✓	✓
IFS-402F		6	4		2 SC/ST			✓		✓	✓
IFS-500C		5	5					✓		✓	✓
IGS-500		5		5				✓		✓	✓
IGS-501S		6		5			1 SFP	✓		✓	✓
IGS-800		8		8				✓		✓	✓
IGS-401F		5		4		1 SC		✓	✓	✓	✓
IGS-402F		6		4		2 SC		✓	✓	✓	✓
IGS-402S		6		4			2 SFP	✓	✓	✓	✓
IFS-402GSM	✓	6	4				2 SFP	✓	✓	✓	✓
IFS-803GSM	✓	11	8				3 SFP	✓	✓	✓	✓
IFS-1604GSM	✓	20	16				4 SFP	✓	✓	✓	✓
IGS-404SM	✓	8		4			4 SFP	✓	✓	✓	✓
IGS-803SM	✓	11		8			3 SFP	✓	✓	✓	✓
IGS-812SM	✓	20		8			12 SFP	✓	✓	✓	✓
IGS-1604SM	✓	20		16			4 SFP	✓	✓	✓	✓

Industrial Ethernet Converters

Model Name	Managed	UTP		Fiber Port			Certification			
		10/100 Base-TX	10/100/1000 Base-T	100Base-FX	1000Base-X	Dual Speed 100/1000Base-X	Railway EN50121-4	Safety UL60950-1	EN61000-6-2 EN61000-6-4	CE, FCC
IMC-100C		1		1 SC/ST			✓		✓	✓
IMC-100		1		1 SC/ST			✓	✓	✓	✓
IMC-1000C			1		1 SC		✓		✓	✓
IMC-1000			1			1 SC	✓	✓	✓	✓
IMC-1000CS			1			1 SFP	✓		✓	✓
IMC-1000S			1			1 SFP	✓	✓	✓	✓
IMC-1000MS	✓		1			1 SFP	✓	✓	✓	✓
IMC-1000M	✓		1			1 SC	✓	✓	✓	✓
IMC-100M	✓	1		1 SC/ST			✓	✓	✓	✓

Industrial Serial Fiber Converters

Model Name	Dual Channel	Serial			Fiber		Certification			
		RS232	RS422/485	Isolation 2.5KV	SC/ST	Daisy Chain	Safty UL60950-1	EN61000-6-2 EN61000-6-4	CE	FCC
IFC-FDC	✓	2	1	✓	2	✓	✓	✓	✓	✓
IFC-Serial	✓	2	1	✓	1		✓	✓	✓	✓

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Industrial Ethernet PoE Switches

Model Name	Managed	Total Port	UTP		Fiber		PoE Port	Certification			
			10/100 Base-TX	10/100/1000 Base-T	1000Base-X	Dual Speed 100/1000Base-X	IEEE802.3at	Railway EN50121-4	UL60950-1	EN61000-6-2 EN61000-6-4	CE FCC
IGS-600-4PH24		6		6			4	✓	✓	✓	✓
IGS-401F-4PH24		5		4	1 SC		4	✓	✓	✓	✓
IGS-402F-4PH24		6		4	2 SC		4	✓	✓	✓	✓
IGS-402S-4PH24		6		4		2 SFP	4	✓	✓	✓	✓
IFS-402GSM-4PH24	✓	6	4			2 SFP	4	✓	✓	✓	✓
IFS-803GSM-8PH24	✓	11	8			3 SFP	8	✓	✓	✓	✓
IGS-803SM-8PH24	✓	11		8		3 SFP	8	✓	✓	✓	✓
IGS-402SM-4PH24	✓	6		4		2 SFP	4	✓	✓	✓	✓

Industrial Ethernet PoE Converters

Model Name	Managed	UTP		Fiber Port		PoE		Input Voltage (Boost)	Certification		
		10/100 Base-TX	10/100/1000 Base-T	100 Base-FX	Dual Speed 100/1000Base-X	IEEE802.3 at /af (PSE)	Power Budget		Railway EN50121-4	EN61000-6-2 EN61000-6-4	CE FCC
IMC-1000-PH12			1		1 SC	1	30W	12/24/48VDC	✓	✓	✓
IMC-1000S-PH12			1		1 SFP	1	30W	12/24/48VDC	✓	✓	✓
IMC-100-PH12		1		1 SC/ST		1	30W	12/24/48VDC	✓	✓	✓
IMC-1000M-PH12	✓		1		1 SC	1	30W	12/24/48VDC	✓	✓	✓
IMC-1000MS-PH12	✓		1		1 SFP	1	30W	12/24/48VDC	✓	✓	✓
IMC-100M-PH12	✓	1		1 SC/ST		1	30W	12/24/48VDC	✓	✓	✓

Industrial PoE Gigabit Ethernet Injector

Model Name	Network	PoE		Input Voltage	Certification		
	10/100/1000 Base-T (UTP)	IEEE802.3 at /af (PSE)	Power Budget		Railway EN50121-4	EN61000-6-2 EN61000-6-4	CE, FCC
INJ-IG60-24	1	1	15/30/36/60/72W	"24/48VDC (Boost)"	✓	✓	✓
INJ-IG01-PH	1	1	15/30/60W	48VDC	✓	✓	✓

Industrial PoE LAN Extender

Model Name	UTP	Long Distance		PoE Port IEEE802.3at	Certification			
	10/100	RJ11	Coaxial		Railway EN50121-4	Safty EN60950-1	EN61000-6-2 EN61000-6-4	CE, FCC
IEXT224-4PH	4	1	1	24/48VDC	✓	✓	✓	✓
IEXT204-4PH	4	1		48VDC	✓	✓	✓	✓

EN50155 Ethernet Switches

Model Name	Managed	IP67	Total Port	UTP M12		Fiber Port	PoE Port IEEE802.3at	Certification					Shock/ Vibration
				10/100 Base-TX	10/100/1000 Base-T	Dual Speed 100/1000Base-X		EN50155	EN50121-4	Safety UL60950-1	EN61000-6-2 EN61000-6-4	CE FCC	IEC61377
ITP-500		✓	5	5				✓	✓		✓	✓	✓
ITP-800		✓	8	8				✓	✓		✓	✓	✓
ITP-800M	✓	✓	8	8				✓	✓	Plan	✓	✓	✓
ITP-802GTM	✓	✓	10	8	2			✓	✓	Plan	✓	✓	✓
ITP-802GSM	✓	✓	10	8		2 SFP		✓	✓	Plan	✓	✓	✓
ITP-G800M	✓	✓	8		8			✓	✓	Plan	✓	✓	✓
ITP-G802SM	✓	✓	10		8	2 SFP		✓	✓	Plan	✓	✓	✓
ITP-800M-8PH24	✓	✓	8	8			8	✓	✓	Plan	✓	✓	✓
ITP-802GTM-8PH24	✓	✓	10	8	2		8	✓	✓	Plan	✓	✓	✓
ITP-802GSM-8PH24	✓	✓	10	8		2 SFP	8	✓	✓	Plan	✓	✓	✓
ITP-G802SM-8PH24	✓	✓	10		8	2 SFP	8	✓	✓	Plan	✓	✓	✓
ITP-G800M-8PH24	✓	✓	8		8		8	✓	✓	Plan	✓	✓	✓

IEC61850-3 Ethernet Switches

Model Name	Managed	Total Port	UTP M12		Fiber Port	Certification			
			10/100 Base-TX	10/100/1000 Base-T	Dual Speed 100/1000Base-X	IEC-61850-3	Safety UL60950-1	Railway EN50121-4	CE, FCC
IPS-G803SM	✓	✓		8	3 SFP	✓	✓	✓	✓
IPS-803GSM	✓	✓	8		3 SFP	✓	✓	✓	✓

Ethernet Device Servers

Model Name	LAN UTP Port	WAN Port		Certification
	10/100Base-TX	RS-232	RS232/422/485	CE, FCC
STE100A-232	✓	✓		✓
STE100A-Serial	✓		✓	✓

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